

EARWIGS (DERMAPTERA) OF SOUTH CAROLINA, WITH A KEY TO
THE EASTERN NORTH AMERICAN SPECIES AND A CHECKLIST
OF THE NORTH AMERICAN FAUNA

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Abstract.—Biological and distributional data are given for the nine species of Dermaptera recorded from South Carolina. A key to the 17 eastern North American species is presented along with brief notes on the taxonomy and distribution of all 22 species occurring in North America north of Mexico.

The most recent comprehensive checklist of North American Dermaptera was published over 35 years ago (Gurney, 1950), and the last key to the eastern North American species was published by Blatchley (1920). In the intervening years new species have been introduced, and the taxonomic status of others has changed. This paper documents the species occurring in South Carolina, presents a revised checklist for the species occurring in North America north of Mexico, and provides a key to eastern North American species. A similar study of the Dermaptera of California provided a key to most of the known western species (Langston and Powell, 1975).

The order Dermaptera comprises some 1200 species worldwide, occurring mostly in the tropics. Only 22 species are currently known from North America, and at least twelve of these were introduced from Europe and the tropics. Seventeen species have been recorded from eastern North America, nine of which have been found in South Carolina. These nine are the most widespread species in the east; the other eight species are restricted to Florida and New Jersey. The remaining five North American species occur only in western United States.

A brief summary of the North American records for non-South Carolina species follows.

There are eight eastern species not found in South Carolina. *Pyragropsis buscki* (Caudell) is a Caribbean species that has become established in the Miami, Florida area (Gurney, 1959). *Euborellia ambigua* (Borelli) was originally described from Costa Rica and has since been recorded from a mangrove swamp near Miami, Florida (Hebard, 1922). *Euborellia caraibeana* Hebard, a species that is widespread in the Caribbean Islands, has been collected in sandy areas on Virginia Key, Florida (Brindle, 1971d). The characters originally used by Hebard (1922) to differentiate *E. caraibeana* from *E. ambigua* have shown considerable variation when a larger series of *E. caraibeana* was examined, making it difficult to distinguish the two species (Brindle, 1971d). This difficulty is reflected in the following key and awaits the collection of a larger series of *E. ambigua* before it can be resolved. *Euborellia annulata* (F.), a native of Indonesia, was recorded by Townes (1946) from Miami, Florida (as *Euborellia stali* [Dohrn, 1864a], synonymized by Brindle, 1981). Specimens of this species are in the Florida State Col-

lection of Arthropods from as far north as Daytona, Florida.

Labia curvicauda (Motschulsky), originally described from Ceylon, has been found on Long Key, Florida, occupying the bases of leaves in the tops of coconut palms (Rehn and Hebard, 1912). *Labia rehni* Hebard is known only from a single female found between boards in a woodshed on Key West, Florida, on 7 July 1912 (Hebard, 1917; Brindle, 1971a). *Doru davisi* Rehn and Hebard is found only in southern Florida, especially around Lake Okeechobee, and is usually associated with saw-grass (Gurney, 1972). *Marava arachidis* (Yersin) was described from southern Europe and has subsequently been introduced into southern Florida (Caudell, 1913). This species has been recorded from two localities in New Jersey by Townes (1946) (as *Marava wallacei* [Dohrn, 1864b], synonymized by Boeseman, 1954). It has also been recorded from Texas, Arizona, and California (Hebard, 1943; Langston and Powell, 1975).

Five species occur only in western United States. *Chelisoche morio* (F.) is a south Pacific species that has been introduced into California (Langston and Powell, 1975). *Euborellia cincticollis* (Gerstaecker) is an African species that is now established in California and Arizona (Langston and Powell, 1975). *Euborellia femoralis* (Dohrn), an Oriental species that is very similar to *E. annulipes*, has been recorded from Arizona and California (Steinmann, 1981). *Vostox apicedentatus* (Caudell) is a native species that has been recorded from California, Arizona, New Mexico, and Texas. It was listed in the genus *Spongovostox* by Langston and Powell (1975) but has been transferred to the genus *Vostox* by Brindle (1971b). *Vostox excavatus* Nutting and Gurney is known only from Arizona, New Mexico, and northwestern Mexico (Nutting and Gurney, 1961).

Labia pilicornis (Motschulsky, 1863) was listed by Gurney (1950) as being established in the United States, but no North Ameri-

can collection records were cited. A footnote associated with the listing stated that Morgan Hebard considered *Labia rehni* to be a junior synonym of *L. pilicornis*, so perhaps it was included in the list in anticipation of this proposed synonymy. Because subsequent workers have maintained the two species as separate and no published Nearctic records have been found, it is doubtful that *L. pilicornis* occurs in North America and thus is omitted from the checklist below. In the Neotropical region, *L. pilicornis* is known only from Cuba (Brindle, 1971d).

Earwigs exhibit sexual dimorphism in both the number of abdominal segments and the shape of the forceps. Males have ten abdominal segments, whereas females have only eight apparent segments due to the fusion of the eighth and ninth segments with the tenth (Giles, 1963). The forceps of males are generally curved and widely separated at the base, and many species have one or more prominent teeth on the inner margins (Figs. 11–25). Female forceps are more or less straight, usually closer together basally than those of the male and lack prominent teeth on their inner margins (Figs. 26–31). Both sexes possess a divided plate called the pygidium, which is located between the bases of the forceps (Fig. 18). The pygidium is thought to be derived from the epiproct and is useful taxonomically, especially in males.

Immature earwigs undergo five to six instars before reaching adulthood. Antennal segments are added at each molt, and wing pads begin to develop in the second or third instar. Immatures are lighter in color than adults and possess conspicuous ecdysial lines on the head and thoracic terga. Immatures have male-like, ten-segmented abdomens, but have female-like, straight forceps.

Material for this study was examined from the following institutions: North Carolina State University, University of Georgia, Florida State Collection of Arthropods, National Museum of Natural History, and Clemson University. The body length of

specimens was measured from the head to the tip of the forceps. A brief diagnosis and information on the synonymy, bionomics, world distribution, and South Carolina distribution are given for those species recorded from South Carolina. The synonymy given for each South Carolina species is complete unless otherwise noted, in which case synonyms commonly used in previous literature on Nearctic species are provided, and a reference is cited which contains a more complete synonymy. South Carolina county records for each species include every county from which the species has been collected, but not necessarily every record from those counties. The known North American distribution of each species is included in the following checklist, with states designated by the two-letter codens assigned by the United States Postal Service. The records used in compiling the checklist are considered to represent established populations, although it is possible that some may represent transient infestations that have since disappeared. The classification system used in the checklist is that of Popham (1965a, b).

CHECKLIST OF THE NORTH AMERICAN
SPECIES OF DERMAPTERA

Superfamily Pygidicranoidea

Family Pygidicranidae

Subfamily Pygidicraninae

Pyragopsis buscki (Caudell, 1907);
FL.

Superfamily Labioidea

Family Carcinophoridae

Subfamily Carcinophorinae

Anisolabis maritima (Bonelli, 1832);
widespread on sea coasts.

Euborellia ambigua (Borelli, 1906);
FL.

Euborellia annulata (F., 1793); FL.

Euborellia annulipes (Lucas, 1847);
widespread.

Euborellia caraiabea Hebard, 1922;
FL.

Euborellia cincticollis (Gerstaecker,
1883); AZ, CA.

Euborellia femoralis (Dohrn, 1863);
AZ, CA.

Family Labiidae

Subfamily Labiinae

Labia curvicauda (Motschulsky,
1863); FL.

Labia minor (L., 1758); widespread.

Labia rehni Hebard, 1917; FL.

Subfamily Spongiphorinae

Marava arachidis (Yersin, 1860); AZ,
CA, TX, NJ, FL.

Marava pulchella (Audinet-Serville,
1839); southeastern U.S., TX.

Vostox apicedentatus (Caudell, 1905);
AZ, CA, NM, TX.

Vostox brunneipennis (Audinet-Ser-
ville, 1839); eastern U.S., TX,
OK.

Vostox excavatus Nutting and Gur-
ney, 1961; AZ, NM.

Superfamily Furficuloidea

Family Labiduridae

Subfamily Labidurinae

Labidura riparia (Pallas, 1773);
southeastern U.S., AZ, CA, TX,
OK.

Family Chelisochidae

Subfamily Chelisochinae

Chelisoches morio (F., 1775); CA.

Family Forficulidae

Subfamily Forficulinae

Doru aculeatum (Scudder, 1876);
eastern U.S., Ontario.

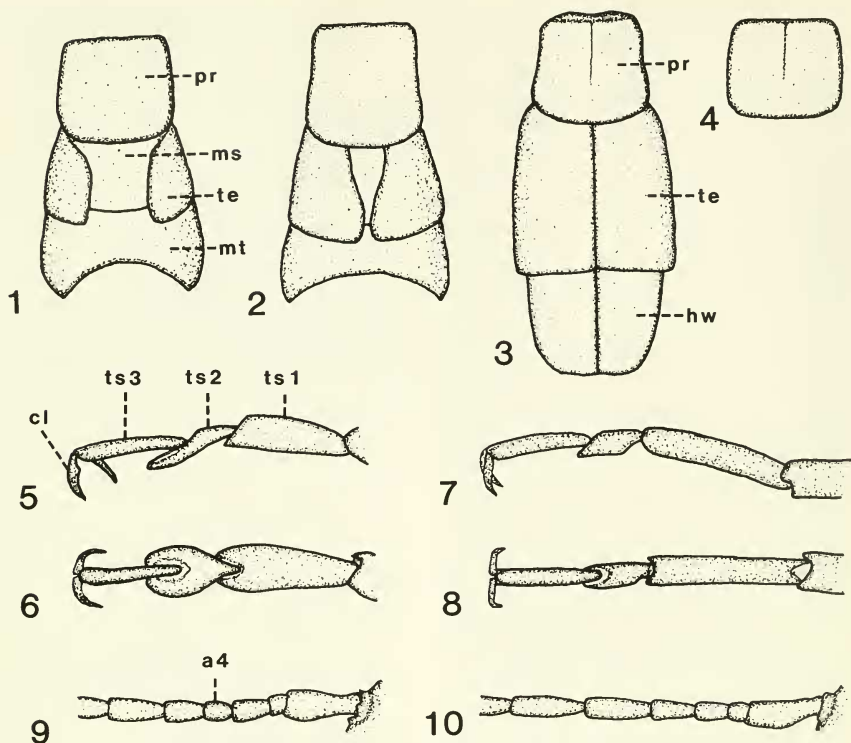
Doru davisii Rehn and Hebard, 1914;
FL.

Doru taeniatum (Dohrn, 1862);
southeastern U.S., AZ, CA, TX.

Forficula auricularia L., 1758; wide-
spread.

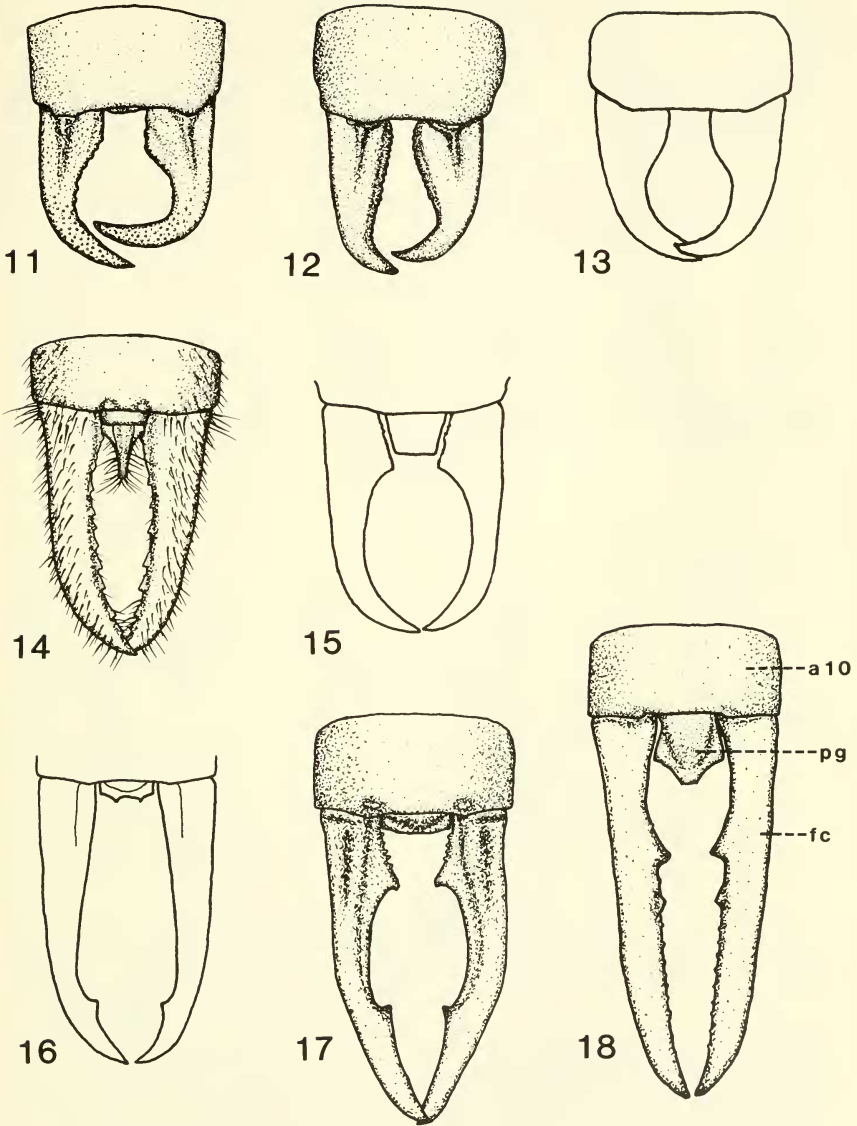
KEY TO ADULTS OF THE EASTERN NORTH
AMERICAN SPECIES OF DERMAPTERA

1. Tegmina absent or present only as rounded flaps that do not meet at the inner basal margins (Figs. 1 and 2); right forceps

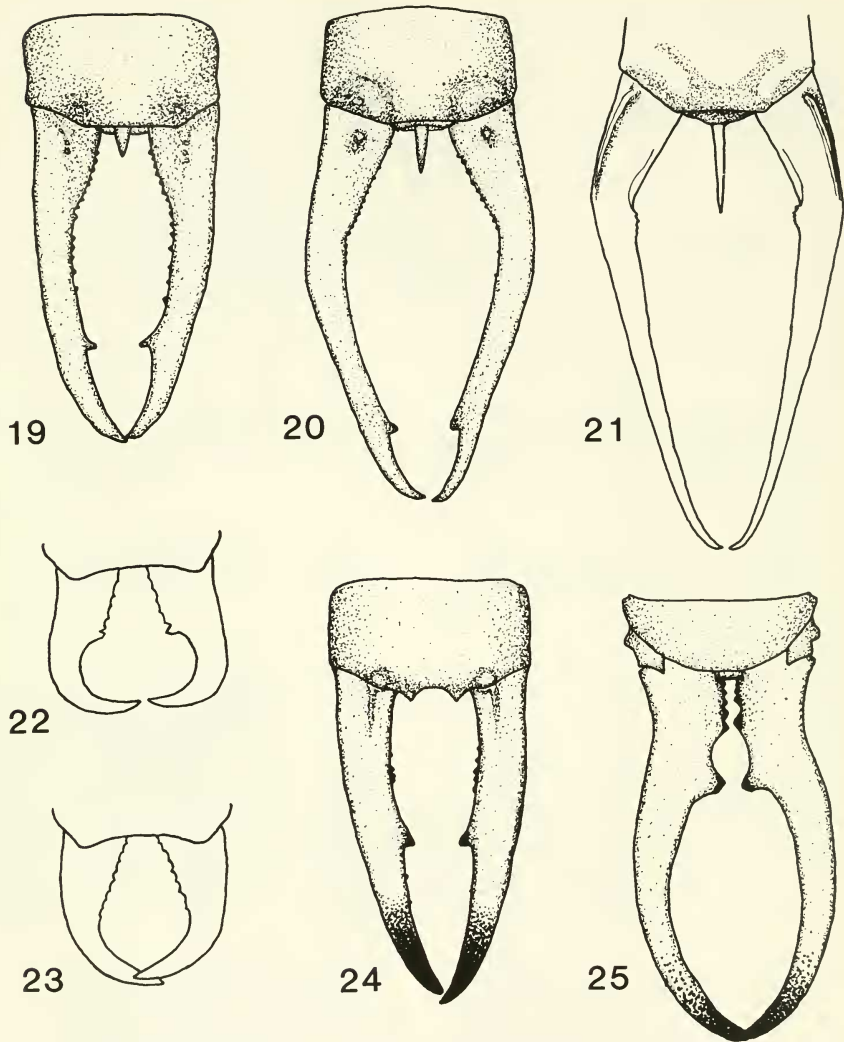


Figs. 1-10. Thoracic terga, metatarsi, and antennal bases of Dermaptera. 1, *Euborellia annulata*, thoracic terga, dorsal view. 2, *E. ambigua*, thoracic terga (redrawn from Hebard, 1922), dorsal view. 3, *Marava pulchella*, pronotum and wings of fully winged form, dorsal view. 4, *M. arachidis*, pronotum (redrawn from Brindle, 1971), dorsal view. 5, *Doru aculeatum*, right metatarsus, lateral view. 6, *D. aculeatum*, right metatarsus, dorsal view. 7, *M. pulchella*, right metatarsus, lateral view. 8, *M. pulchella*, right metatarsus, dorsal view. 9, *Forficula auricularia*, base of right antenna, dorsal view. 10, *D. aculeatum*, base of right antenna, dorsal view. a4 = fourth antennal segment, cl = tarsal claw, hw = hindwing, ms = mesonotum, mt = metanotum, pr = pronotum, te = tegmina, ts1 = first tarsal segment, ts2 = second tarsal segment, ts3 = third tarsal segment.

of male curved inward more strongly than left (Figs. 11-12) (Carcinophoridae)	2	-	Tegminal flaps covering most of mesonotum (Fig. 2); legs unicolorous or femora darkened; left forceps of male curved almost as much as right (Fig. 13)	4
- Tegminae normally developed and meeting along entire midline (Fig. 3); forceps of male symmetrical (Figs. 14-25)	6	4(3).	Legs uniformly pale; tegminal flaps not always meeting at midline (Fig. 2); found only in mainland mangrove swamps	<i>Euborellia ambigua</i> (Borelli)
2(1). Tegminae present as rounded lateral flaps on mesonotum (Figs. 1 and 2); Florida	3	-	Legs pale or with femora darkened; tegminal flaps always meeting or overlapping at midline; found in various habitats on islands	<i>Euborellia caraibeae</i> Hebard
- Tegminae absent; widespread	5	5(2).	Antennae entirely dark brown, 20-24 seg-	
3(2). Tegminal flaps widely separated on mesonotum (Fig. 1); legs with brown rings around femora and tibiae; left forceps of male curved only at apex (Fig. 12)				
. <i>Euborellia annulata</i> (F.)				



Figs. 11-18. Male forceps of Dermaptera, dorsal views. 11, *Anisolabis maritima*. 12, *Euborellia annulipes*. 13, *E. ambigua* (redrawn from Hebard, 1922). 14, *Labia minor*. 15, *L. curvicauda* (redrawn from Brindle, 1971a). 16, *Marava arachidis* (redrawn from Brindle, 1971b). 17, *M. pulchella*. 18, *Vostox brunneipennis*. a10 = tenth abdominal segment, fc = forceps, pg = pygidium.



Figs. 19–25. Male forceps of Dermaptera, dorsal views. 19, *Doru taeniatum*. 20, *D. aculeatum*. 21, *D. davisi* (redrawn from Gurney, 1972). 22, *Pyragropsis buscki*, arcuate form (redrawn from Gurney, 1959). 23, *P. buscki*, elongate form (redrawn from Gurney, 1959). 24, *Labidura riparia*. 25, *Forficula auricularia*.

mented; femora and tibiae without encircling dark bands; body length 20–25 mm

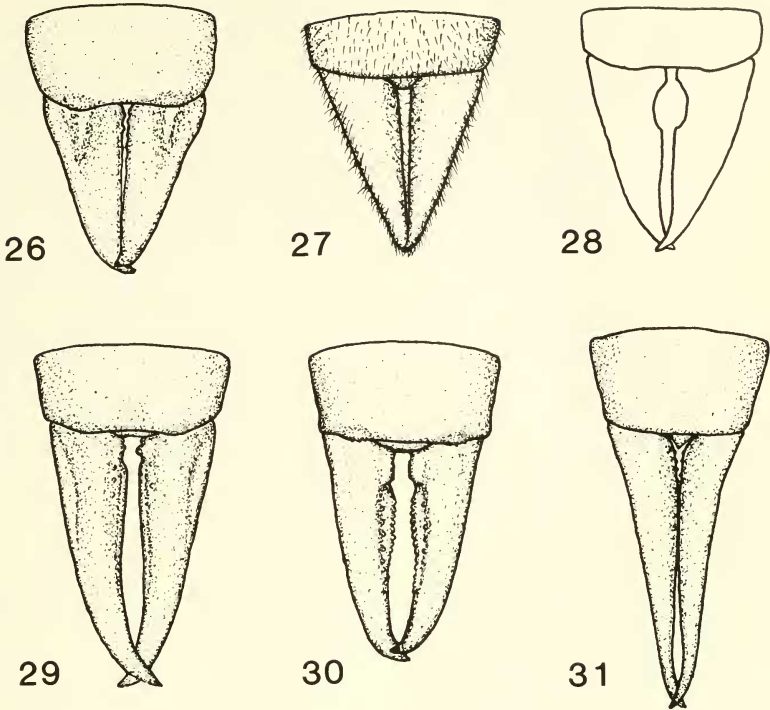
..... *Anisolabis maritima* (Bonelli)

– Antennae brown with 1–3 white subapical segments, 14–18 segmented; femora and

tibiae pale yellow with encircling dark bands; body length 12–18 mm

..... *Euborellia annulipes* (Lucas)

6(1). Second tarsal segments cylindrical and not wider than third, at most only slightly ex-



Figs. 26–31. Female forceps of Dermaptera, dorsal views. 26, *Euborellia annulipes*. 27, *Labia minor*. 28, *L. rehni* (redrawn from Hebard, 1917). 29, *Marava pulchella*. 30, *Vostox brunneipennis*. 31, *Doru aculeatum*.

- | | | | | |
|-------|---|----|--|----|
| - | tended beneath third (Figs. 7 and 8) . . . | 7 | male pygidium prominent (Figs. 14–18) (Labiidae) | 9 |
| - | Second tarsal segments dilated and much wider than third, extending conspicuously beneath third (Figs. 5 and 6) (Forficulidae) | 14 | 9(8). Tegminae pubescent; body length less than 8 mm | 10 |
| 7(6). | Large pad-like arolium between tarsal claws; hindwings visible; body length 14–19 mm; male forceps of two types, both forms curved strongly inward (Figs. 22 and 23) | | - Tegminae glabrous; body length 8–18 mm | 12 |
| - | No arolium between tarsal claws; hindwings visible or not; body length variable; male forceps not strongly incurved (Figs. 14–18) | 8 | 10(9). Tegminae as long as pronotum; visible portion of hindwings only half length of pronotum; inner margin of female forceps notched basally (Fig. 28) | |
| 8(7). | Antennae 25–30 segmented; pronotum light brown with two dark longitudinal stripes; body length 20–30 mm; male pygidium reduced and not visible in dorsal view (Fig. 24) | | <i>Labia rehni</i> Hebard | |
| - | Antennae 10–16 segmented; pronotum unicolorous; body length less than 20 mm; | | - Tegminae much longer than pronotum; visible portion of hindwings as long as pronotum; inner margin of female forceps not notched basally (Fig. 27) | 11 |
| | | | 11(10). Head and thorax black; abdomen reddish; male pygidium quadrate; inner margin of male forceps curved (Fig. 15) | |
| | | | <i>Labia curvicauda</i> (Motschulsky) | |
| | | | - Body yellowish-brown to brown; male pygidium elongated medially; inner margin | |

- of male forceps straight (Fig. 14)
 *Labia minor* (L.)
- 12(9). Male pygidium large, produced medially (Fig. 18); hindwings always present; antennae entirely brown; body length 12–16 mm *Vostox brunneipennis* (Audinet-Serville)
- Male pygidium not produced medially (Figs. 16–17); hindwings often absent or concealed; basal 2–3 antennal segments yellow, remainder brown; body length 8–12 mm 13
- 13(12). Pronotum broader than long (Fig. 4); male pygidium pentagonal; male forceps without inner basal tooth (Fig. 16)
 *Marava arachidis* (Yersin)
- Pronotum as broad as long (Fig. 3); male pygidium quadrate; male forceps with inner basal tooth (Fig. 17) .. *Marava pulchella* (Audinet-Serville)
- 14(6). Fourth antennal segment less than twice as long as broad (Fig. 9); tegminae dark brown; male pygidium truncate; male forceps broadened, almost touching basally (Fig. 25) *Forficula auricularia* L.
- Fourth antennal segment more than twice as long as broad (Fig. 10); tegminae yellow with brown inner margins; male pygidium spine-like; male forceps widely separated at base (Figs. 19–21) 15
- 15(14). Hindwings visible beyond tegminae
 *Doru taeniatum* (Dohrn)
- Hindwings not visible beyond tegminae 16
- 16(15). Male forceps with tooth near apex (Fig. 20); male pygidium distinctly shorter than length of last abdominal segment
 *Doru aculeatum* (Scudder)
- Male forceps without tooth near apex (Fig. 21); male pygidium as long as length of last abdominal segment *Doru davisi* Rehn and Hebard

DERMAPTERA OF SOUTH CAROLINA

Anisolabis maritima (Bonelli, 1832)

Fig. 11

Forficula maritima Bonelli, 1832, in Gén e, Ann. Sci. Regn. Lomb.-Venet. 2: 224.

Anisolabis maritima (Bonelli) Fieber, 1853, Lotos 3: 257.

Steinmann (1984) gives a more complete synonymy.

Anisolabis maritima can be distinguished from the other wingless species occurring in

South Carolina by the 20–24 segmented antennae, lack of dark encircling bands on the legs, and 20–25 mm body length. This species has been cited as *A. maritima* (G n e, 1832) in earlier papers. *Anisolabis maritima* is usually found underneath litter and driftwood along seashores (Langston, 1974). This earwig forages at night and is predaceous; its prey includes crickets, sandfleas, and smaller earwigs (Bennett, 1904).

This species is essentially cosmopolitan. Introduced into North America, *A. maritima* now occurs locally along the Pacific coast from British Columbia south to California, and along the Atlantic and Gulf coasts from Maine to Florida and westward to Texas (Langston and Powell, 1975).

South Carolina Records.—*Anisolabis maritima* probably occurs locally along the entire South Carolina coast. Beaufort Co.: Beaufort, 14 June 1930, coll. O. L. Cartwright, 1 ♀; Bluffton, 2 April 1933, coll. D. Dunavan, 1 ♂, 2 ♀, 2 immatures. Horry Co.: 30 August 1981, coll. S. Mudge, 1 ♂. Pickens Co.: Clemson, 23 June 1980, under board in barn, coll. C. Lay, 1♀.

Euborellia annulipes (Lucas, 1847)

The Ringlegged Earwig

Figs. 12, 26

Forficesila annulipes Lucas, 1847, Ann. Soc. Entomol. Fr. 5: 84.

Anisolabis annulicornis Blanchard, 1851, in Gay, Hist. Fisica Pol. Chile, Zool. 6: 10.

Euborellia annulipes (Lucas) Burr, 1915, J. R. Microsc. Soc. 35: 545.

Sakai (1970a) gives a more complete synonymy.

The ringlegged earwig can be distinguished from the only other wingless species in South Carolina by its 14–18 segmented antennae, dark encircling bands on the femora and tibiae, and 12–18 mm body length. The dark brown antennae generally have the third, fourth, and sometimes fifth subapical segments pale yellow to white, although a few specimens show only one or no pale segments.

Euborellia annulipes is a general scavenger that is commonly found on the ground underneath rocks, logs, and other debris. This earwig can cause minor damage to plants and stored foods when it enters greenhouses, nurseries, and warehouses (Bharadwaj, 1966). However, it is also predaceous and will attack other insect pests. The ringlegged earwig is an introduced species that occurs worldwide. It has been established in North America for at least 140 years and now occurs virtually throughout the United States and into British Columbia (Langston and Powell, 1975; Scudder and Vickery, 1985).

South Carolina Records.—The ringlegged earwig is the most commonly encountered species in the state. Aiken Co.: Windsor, 25 November 1933, coll. O. L. Cartwright, 1 ♀. Anderson Co.: Pendleton, 31 October 1975, in cotton trash, coll. P. Zinsmelster, 1 ♂, 1 ♀, 2 immatures. Barnwell Co.: Elko, 30 July 1981, debris under pig feeding trough, coll. J. R. Brushwein, 1 ♂, 2 ♀, 1 immature. Beaufort Co.: Beaufort, 30 October 1925, under trash, coll. F. Sherman, 1 immature. Charleston Co.: Charleston, 5 May 1951, coll. D. Dunavan, 1 ♀. Cherokee Co.: Gaffney, 15 August 1939, coll. L. M. Sparks, 1 ♀. Clarendon Co.: Summerton, 31 March 1929, coll. O. L. Cartwright, 1 immature. Colleton Co.: Bear Island, 30 September 1979, grass, coll. B. Hendrix, 1 ♀. Darlington Co.: Darlington, 19 June 1929, coll. J. M. Napier, 1 ♀. Dorchester Co.: Summerville, 15 August 1931, F. Sherman, 1 ♂. Edgefield Co.: Trenton, 19 November 1959, trunk of peach tree, coll. T. E. Skelton, 1 immature. Florence Co.: Florence, 17 July 1981, leaf litter, coll. R. D. Simpson, 2 ♀. Lee Co.: Meredith, 22 June 1926, coll. O. L. Cartwright, 1 ♂, 1 ♀. Oconee Co.: Fairplay, 18 October 1984, under feathers in chicken house, coll. W. Barton, 2 immatures. Orangeburg Co.: Orangeburg, 22 July 1927, coll. F. Sherman, 1 ♀. Pickens Co.: Clemson, 1 December 1983, beneath rock in garden, coll. J. Joly, 1 ♀, 2 immatures. Richland Co.: Columbia, 21 February 1926, O. Cart-

wright, 1 ♀. Spartanburg Co.: Greer, 31 October 1976, coll. M. McClimon, 1 ♀.

***Labia minor* (L., 1758)**

Figs. 14, 27

Forficula minor Linnaeus, 1758, Syst. Nat. (10) 1: 423, no. 2.

Labia minor (L.) Stephens, 1835, Ill. Brit. Entomol., Mand. 6: 8.

Labia minuta Scudder, 1862, Boston J. Nat. Hist. 7: 415.

Sakai (1970b) gives a more complete synonymy.

Labia minor is distinguished from all other earwigs in South Carolina by both the abundance of golden hair covering most of its body and its small body size (less than 8 mm long). It resembles a small rove beetle (Staphylinidae) and as such is often put into unsorted collections of these beetles. *Labia minor* is both a scavenger and a predator and can be found under various kinds of debris. It flies readily and is frequently attracted to lights. *Labia minor* is found in temperate and subtropical zones worldwide and is another species that has been introduced into the Nearctic region. Like *E. annulipes*, it is now distributed throughout North America (Langston and Powell, 1975; Scudder and Vickery, 1985).

South Carolina Records.—*Labia minor* is presently known only from the extreme northwestern part of the state. It may well occur in other parts of the state, being commonly overlooked because of its small size. Anderson Co.: Pendleton, 28 July 1972, in cottonseed, coll. R. P. Griffin, 1 ♀. Pickens Co.: Clemson, 23 June 1956, in light trap, coll. D. Dunavan, 1 ♂; Clemson, 19 September 1985, in cattle feed at Clemson Univ. dairy barn, coll. K. M. Hoffman, 1 immature; Clemson, 5 October 1984, flying in field, coll. J. Barron, 1 ♂; Clemson, 20 April 1939, at light, coll. F. T. Arnold, 1 ♂.

***Marava pulchella* (Audinet-Serville, 1839)**

Figs. 3, 7, 8, 17, 29

Forficula pulchella Audinet-Serville, 1839, Hist. Nat. Ins. Orthop. p. 42.

Labia guttata Scudder, 1876b, Proc. Boston Soc. Nat. Hist. 18: 265.

Labia burgessi Scudder, 1876b, Proc. Boston Soc. Nat. Hist. 18: 266.

Labia melancholica Scudder, 1876b, Proc. Boston Soc. Nat. Hist. 18: 267.

Prolabia pulchella (Audinet-Serville) Hebard, 1917, Entomol. News 28: 319.

Laprobia pulchella (Audinet-Serville) Hincks, 1960, Proc. R. Entomol. Soc. Lond. (B) 29: 156.

Marava pulchella (Audinet-Serville) Brindle, 1971a, J. Nat. Hist. 5: 557.

Marava pulchella is the only earwig in South Carolina that exhibits both fully winged and brachypterous adults. When the tegminae and hindwings are fully developed, the hindwings are visible, somewhat lighter in color basally, and the compound eyes are large. Brachypterous individuals have shorter tegminae, hindwings that are either absent or concealed, and smaller compound eyes. Factors governing the relative proportions of these morphs in a population are not known for *M. pulchella*, but temperature has been shown to be influential for a different species (Knabke and Grigarick, 1971). Each branch of the male forceps generally has two teeth located apically and basally on the inner margin, although in some specimens the apical tooth may be missing.

This earwig can be found under the bark of dead trees and in debris. Fully winged adults can be attracted to lights. *Marava pulchella* is native to southeastern United States, being found from North Carolina south to Florida and westward to Texas. It has also been recorded from Cuba (Alayo and Hernández, 1980).

South Carolina Records.—*Marava pulchella* probably occurs statewide. Anderson Co.: Pendleton, 28 July 1972, in cotton seed, coll. R. P. Griffin, 1 ♂. Florence Co.: Florence, 29 March 1930, coll. O. L. Cartwright, 1 ♂, 1 immature. Hampton Co.: Yemassee, 5 January 1928, coll. J. A. Berly, 1 ♂; Ye-

massee, 28 December 1941, coll. O. L. Cartwright, 1 ♂. Lee Co.: Meredith, 19 April 1928, coll. O. L. Cartwright, 1 ♂. Pickens Co.: Clemson, 7 March 1935, coll. J. G. Watts, 1 immature; Clemson, 20 October 1972, hickory log, coll. R. P. Griffin, 1 ♂; Isaquena Forest, 2 August 1984, UV light trap, coll. K. M. Hoffman, 1 ♀; Clemson, 15 August 1986, porchlight, coll. K. M. Hoffman, 1 ♂. Richland Co.: Columbia, 20 February 1926, coll. O. Cartwright, 1 immature.

***Vostox brunneipennis*
(Audinet-Serville, 1839)**

Figs. 18, 30

Psalidophora brunneipennis Audinet-Serville, 1839, Hist. Nat. Ins. Orthop. p. 30.

Vostox brunneipennis (Audinet-Serville) Burr, 1911, Genera Insect. 122: 51.

This earwig is a reddish-brown to dark brown species with yellow hindwings that are bordered on their apical and inner margins with brown. The male forceps usually have a single tooth located on the inner margin near the midpoint, although some specimens possess a second tooth distally (Fig. 18). This species is most commonly found under the bark of dead trees, but adults can also be attracted to lights.

Vostox brunneipennis, a native species, is found from Panama northward to the southern United States. The holotype is from Pennsylvania, and in the United States this species is known from Illinois, Indiana, and Virginia south to Florida and westward to Texas and Oklahoma (Brindle, 1971b; Arnold and Drew, 1979).

South Carolina Records.—*Vostox brunneipennis* probably occurs statewide. Anderson Co.: Anderson, 11 March 1982, coll. G. Jones, 1 ♂. Greenwood Co.: Greenwood, 5 February 1977, coll. P. Ellenburg, 1 ♀. Lee Co.: Meredith, 12 February 1927, coll. O. L. Cartwright, 1 ♂, 3 ♀. Pickens Co.: Clemson, 9 January 1986, under bark of dead standing oak tree, coll. J. R. Brushwein, 1

♂; Clemson, 1 August 1956, in trap light, coll. D. Dunavan, 1 ♀; Six Mile, 17 October 1973, under log, coll. R. Peigler, 1 immature. Saluda Co.: Ridge Spring, 25 July 1984, under bark of dead oak tree on ground, coll. D. E. Scotten, 2 immatures.

***Labidura riparia* (Pallas, 1773)**

The Striped Earwig

Fig. 24

Forficula riparia Pallas, 1773, Reise Russ. Reiches 2: 727.

Forficula bidens Olivier, 1791, Encycl. Method. 6: 466.

Forficula erythrocephala Fabricius, 1793, Entomol. Syst. 2: 4.

Labidura riparia (Pallas) Dohrn, 1863, Stett. Entomol. Zeit. 24: 313.

For a more complete synonymy, see Steinmann (1978).

The striped earwig is most easily recognized by both its large size and the two dark bands running the length of the pronotum. Also, there is a broad, dark, medio-dorsal band extending the length of the abdomen. This species is primarily predaceous, actively seeking its prey at night (Schlinger et al., 1959). It can be collected on the ground at night or under debris during the day.

Labidura riparia is an introduced species that occurs worldwide in both tropical and temperate zones. In the United States this earwig is established in the southern third of the country, from North Carolina south to Florida and westward to Texas, Arizona, and California (Langston and Powell, 1975).

South Carolina Records.—The striped earwig is found throughout the state. Barnwell Co.: Blackville, 24 October 1975, Edisto Expt. Sta., pitfall traps from soybeans, coll. J. F. Price, 5 ♂, 5 ♀. Beaufort Co.: Seabrook, 18 October 1980, coll. M. K. Disney, 1 immature. Charleston Co.: Charleston, 7 February 1934, coll. J. A. Berly, 1 ♂. Edgefield Co.: Trenton, 19 November 1959, trunk of peach tree, coll. T. E. Skelton, 1 ♂. Greenville Co.: Greenville, 30 September

1933, coll. H. T. Poe, Jr., 1 ♂. Horry Co.: Myrtle Beach, 27 December 1955, in dwelling of Joe C. Ivey, coll. D. Dunavan, 1 ♂, 1 ♀. Pickens Co.: Clemson, 10 October 1961, under wood slat, coll. R. E. O'Brien, 1 immature; Clemson, 26 September 1984, on cement beneath lights at night, coll. K. M. Hoffman, 1 ♀. Sumter Co.: Sumter, February 1955, coll. unknown, 1 immature.

***Doru aculeatum* Scudder, 1876**

Figs. 5, 6, 10, 20, 31

Forficula aculeata (Scudder, 1876a, Proc. Boston Soc. Nat. Hist. 18: 262.

Doru aculeatum (Scudder) Rehn and Hebard, 1914, J. N.Y. Entomol. Soc. 22: 93.

Doru aculeatum is 12–18 mm long, and can be distinguished from the closely related species *D. taeniatum* by the lack of visible hindwings. This earwig is generally found on grasses and sedges growing near water (Hebard, 1934; Cantrell, 1968). *Doru aculeatum* is native to eastern North America, ranging from southern Michigan and Ontario to Florida and westward to Illinois, Nebraska, and Louisiana.

South Carolina Records.—*Doru aculeatum* has only been found in the extreme northwestern part of the state and at Myrtle Beach. Anderson Co.: Portman Shoals, 24 November 1927, coll. F. Sherman, 2 ♂, 1 ♀. Horry Co.: Myrtle Beach, 1 March 1965, sedge, coll. V. M. Kirk, 2 ♂. Oconee Co.: Seneca, 10 September 1969, on jewel weed, coll. J. W. Van Duyn, 1 ♂. Pickens Co.: Clemson, 14 October 1961, in corn ear, coll. J. A. DuRant, 3 ♂, 1 ♀; Pickens, 28 March 1978, coll. J. Keith, 1 ♂; Rocky Bottom, 22 May 1934, coll. O. L. Cartwright, 1 ♂; Six Mile, 26 October 1963, under dead willow bark, coll. D. G. Bottrell, 1 ♂, 1 ♀.

***Doru taeniatum* (Dohrn, 1862)**

Fig. 19

Forficula taeniata Dohrn, 1862, Stett. Entomol. Zeit. 23: 230.

Forficula californica Dohrn, 1865, Stett. Entomol. Zeit. 25: 85.

Forficula exilis Scudder, 1876a, Proc. Boston Soc. Nat. Hist. 18: 262.

Doru exile (Scudder) Burr, 1911, Genera Insect. 122: 79.

Doru lineare (Eschscholtz) Burr, 1911, Genera Insect. 122: 79 (*partim*).

Doru taeniatum (Dohrn) Brindle, 1971c, Papeis Avulsos Zool. 23: 191.

Doru taeniatum is distinguished from the closely related *D. aculeatum* by the presence of visible hindwings. The species *Doru lineare* (Eschscholtz, 1822) is listed by Blatchley (1920), Gurney (1950), and Langston and Powell (1975) as occurring in the United States. However, a revision of the genus *Doru* has shown the range of this species to be limited to Brazil, Argentina, and Paraguay (Brindle, 1971c). Records of this species in North America are now referable instead to *D. taeniatum* (Gurney, 1972).

Doru taeniatum ranges from Bolivia and Colombia northward to the southeastern United States (Brindle, 1971c). It has been found as far north as Maryland and as far west as Texas, Arizona, and California. It is unclear whether it is native to North America or was introduced from Central and South America (Gurney, 1972).

South Carolina Records.—*Doru taeniatum* probably occurs locally statewide, but seems to be more prevalent in the southern and eastern counties. Barnwell Co.: Blackville, 18 October 1978, on soybeans, coll. G. Sanders, 1 ♀. Berkeley Co.: St. Stephen, 17 September 1983, coll. T. Johnson, 1 ♂. Charleston Co.: Charleston, 17 March 1980, coll. M. Wallace, 1 ♂. Dorchester Co.: Four Holes Swamp, 13 August 1976, Mellards Lake, coll. J. Morse and J. Chapin, 1 ♀. Hampton Co.: 1 October 1983, coll. D. Edwards, 1 ♂. Horry Co.: Conway, 20 March 1976, woods, coll. T. Thompson, 1 ♀. Pickens Co.: Clemson, 16 March 1976, on ground, coll. C. Wilson, 1 ♂; Clemson, 10 October 1976, coll. T. Currin, 1 adult;

Clemson, 18 September 1978, coll. C. Whitmire, 1 ♀.

Forficula auricularia L., 1758

The European Earwig

Figs. 9, 25

Forficula auricularia Linnaeus, 1758, Syst. Nat. (10) 1: 423, no. 1.

Sakai (1973) gives a more complete synonymy.

The European earwig is 15–20 mm in length and can be recognized by the basally broadened forceps of the male (Fig. 25). It is the most economically destructive earwig, occasionally causing substantial damage to cereals, fruits, seedling vegetables, and flowers. Unlike most earwigs, the European earwig does not survive well in warm climates, preferring instead cool, moist regions (Crumb et al., 1941). The European earwig occurs in temperate regions around the world and has become widely established in North America. It has been recorded locally across southern Canada southward to North Carolina and westward to Arizona and California (Langston and Powell, 1975; Scudder and Vickery, 1985).

South Carolina Records.—The only record of this species in South Carolina is of a female taken in Charleston. Due to this species' preference for cool climates and the fact that Charleston is a major seaport, it is possible that this specimen is an adventive and not a member of an established population. Further collecting is necessary to determine whether the European earwig is established in South Carolina. Charleston Co.: Charleston, 30 October 1983, coll. B. F. Celek, 1 ♀.

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